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If, now, a pupil is asked for his or her age at last birthday and answers correctly, and is then requested to give the year of birth, it is positively astonishing how large a percentage of children—even high-school pupils—will give erroneous answers. More than that, if parents are asked for the age and birthday, month and year, of their children, relatively few fathers can give correct answers, as far as my experience goes, and many mothers can not answer questions correctly.

A very small percentage of high-school children or even of adults seem to know the age or birth year of their parents.

To gather trustworthy information from negroes as to age seems almost a hopeless undertaking, for about one-half of the negro school children questioned had no idea how old they were or on what day or in what month or year they were born.

The information gathered from white children is much more detailed and trustworthy than that gathered from negroes.

The foregoing remarks apply not only to families of laborers and farmers, but to educated families, to professional families, to leading families in a community, and they apply much more generally than one would suspect before attempting to gather the information.

The condition described is additional evidence in favor of a rapid extension of birth registration and issuance of birth-registration certificates to parents, for the subject is one of practical application not only in legal but also in medical matters.

THE PURITY AND STRENGTH OF HOUSEHOLD REMEDIES.

VARIATIONS IN PURITY AND STRENGTH OF WIDELY USED DRUGS AND PREPARATIONS A POSSIBLE SOURCE OF DANGER TO THE PATIENT.

By Martin I. Wilbert, Technical Assistant, Division of Pharmacology, Hygienic Laboratory, United States Public Health Service.

Up to the present time insufficient authoritative information is available regarding the variability of drug action due either to the condition of the patient or to the differences in the strength and purity of the several drugs or preparations used as remedies for the prevention or cure of diseases.

That these causes of variation in drug action involve problems of considerable importance is evidenced by the fact that the normal metabolic processes of the human organism are readily interfered with, and that no two persons will react exactly alike to physical or chemical stimuli.

While the problems involved in the differences in the reaction of the human organism to the effect of medicines because of idiosyncrasy or special susceptibility of the patient are as yet largely beyond the control of medical men, the possible harmful influences of drugs because of their variation in purity or strength might, very properly, be given immediate attention by all who are in any way interested in the welfare of the human kind.

That complex or little-used drugs and preparations vary considerably in composition and purity is generally recognized, and physicians in directing the administration of such medicines usually safeguard the patient by restricting the use of the medicine to the production of some one well-established action or effect.

The variability in strength and purity of the more simple preparations frequently used as household remedies is not so generally recognized and the all too common indiscriminate use of such preparations is fraught with dangers that are not sufficiently well known.

The enactment of the Federal food and drugs law and the adoption of similar laws in practically all of the several States have served to attract attention to the adulteration of drugs and the enforcement of these laws should furnish a liberal supply of information regarding the shortcomings of drugs and preparations sold for use as medicine.

Hygienic Laboratory Bulletin No. 98, "A Digest of Comments on the Pharmacopœia of the United States and on the National Formulary for the Calendar year ending December 31, 1913," reflects in a rather comprehensive way the activities of the several State food and drug laboratories in so far as they relate to the examination and control of well established pharmacopœial drugs and preparations.

From a comparative study of the several available reports it is evident that the enforcement of State food and drug laws is far from being consistent and is certainly not persistent. The differences in the nature of the available reports also indicate that as yet the officials intrusted with the enforcement of food and drug laws differ greatly as to how the several laws can best be enforced and as to whether any appreciable amount of good can be accomplished by enforcing them.

As suggested in a previous communication (Pure Drugs and the Public Health, Public Health Reports, 1914, v. 29, p. 1137) the laws designed to regulate the practice of pharmacy or to restrict the distribution of potent medicines to specially trained and capable individuals who might be held directly responsible for the purity and strength of drugs and medicines are not at all effectively enforced, and the existing status of the medicine-supply business, therefore, is far from creditable to those concerned and constitutes, in effect, a serious menace to public health.

The references included in Public Health Bulletin No. 98, referred to above, show that in the chemical laboratories of the Minnesota drug and food department during the years 1902 to 1912, inclusive, a total of 50,972 samples were examined, of which 18,494, or 36.3 per cent, were found to be illegal.

A compilation of the data included in the earlier numbers of the Digest of Comments (J. Am. M. Assoc., 1913, v. 61, p. 189–191), shows that of more than 9,000 samples of six widely used pharmaceutical preparations reported on during five years more than 4,000, or approximately 45 per cent, were found to be not in compliance with the requirements of the Pharmacopœia.

A table giving the totals of the analytical results reported by eight observers shows that of 3,603 samples of drugs and medicinal preparations reported no less than 1,046, or slightly more than 29 per cent, were rejected.

The following table presents a compilation of the reported results of analyses by State chemists of samples of 10 official articles that are widely used as household remedies and emphasizes still further the need for adequate supervision of medicines that are frequently and at times freely used as household remedies.

The articles classed as rejected were found to be either grossly adulterated or to be 10 or more per cent above or below the strength prescribed by the Pharmacopœia.

Table showing reported results of analyses of samples of 10 official articles widely used as household remedies.

[A compilation from Hygienic Laboratory Bulletin No. 98.]

	Number of reporters.	Number of samples.		Per cent of samples rejected.
		Examined.	Rejected.	
Alcohol	5	382	64	17
Camphor, spirit of	13	466	213	45
Camphor, liniment of	7	265	91	37
Ginger, tincture of	5	78	30	38
Iodine, tincture of	16	774	326	42
Opium, tincture of	5	29	15	50
Peppermint, spirit of	14	799	190	25
Solution of hydrogen peroxide	8	140	51	36
Spirit of nitre	13	379	245	65
Lime water	5	160	34	21
Total	....	3,472	1,259	38

The second table compiled from the data included in Hygienic Laboratory Bulletin No. 93, "A Digest of Comments for the Calendar Year Ending December 31, 1912," serves to show that the existing conditions are apparently stationary and that despite considerable variation in the relative number of the individual samples rejected the total per cent of rejected samples is practically the same.

Table showing reported results of analyses of samples of 10 official articles widely used as household remedies.

[A compilation from Hygienic Laboratory Bulletin No. 93.]

	Number of reporters.	Number of samples.		Per cent of samples rejected.
		Examined.	Rejected.	
Alcohol	7	98	47	48
Camphor, spirit of	19	802	423	53
Camphor, liniment of	8	597	99	17
Ginger, tincture of	7	74	30	41
Iodine, tincture of	18	984	474	48
Opium, tincture of	11	252	125	50
Peppermint, spirit of	14	270	139	51
Solution of hydrogen peroxide	13	1,026	90	9
Spirit of nitre	22	609	336	55
Lime water	10	635	98	15
Total	....	5,347	1,861	35

The preparations included in the above tables are much more frequently used as household remedies than on the prescription of physicians. Alcohol, while it is perhaps more commonly used as a solvent or for burning, is being quite generally used as an external application, particularly as a rub after active exercise or an unusually hot or cold bath.

Apart from the serious possibility of having a refined grade of methyl alcohol substituted for grain alcohol, it has been found that much of the commercial product is of inferior quality and frequently consists of the unrefined "heads and tails" of a run from the still. This commercial product is usually contaminated with the secondary products of fermentation and therefore does not comply with the pharmacopœial requirements for a medicinal product.

The higher alcohols and the aldehydes present in commercial alcohol not only increase the toxicity of the product but also serve to make it much more irritating when applied locally, and the combination of odoriferous substances may be such as to be at times nauseating.

The substitution of wood or methyl alcohol for grain alcohol is of course dangerous and highly reprehensible. That this substitution still occurs would appear from the report of the New Jersey Board of Health for 1912, in which the statement occurs that "Analyses made in the laboratory of hygiene, division of food and drugs, show that methyl alcohol is a common constituent of the cheaper grades of products."

These "cheaper grades of products" include practically all of the alcohol-containing household remedies enumerated in the above list. Many if not all of these preparations are sold by itinerant vendors and by keepers of general stores. The preparations so sold are usually purchased from the person supplying them at the lowest price and no systematic attempt is made to control the products in any way.

In a few States preparations of peppermint, champhor, iodine, ginger, and opium are by law required to be of pharmacopœial strength, but usually their inferiority is carefully masked by the use of misleading statements as to strength, or the stereotyped phrase, "For technical use."

That even tincture of opium is still widely used as a household remedy is evident from a communication which appears in a recent issue of the Pharmaceutical Journal (1914, v. 92, p. 653). This contributor asserts that for every ounce of tincture of opium that he dispenses on prescription he sells at least a gallon by retail. He further avers that most druggists do practically the same thing, and that he knows of people who can drink two ounces of tincture of opium three times a day.

The danger of variation in a preparation of this type is quite apparent, and the possible harm that may be caused by a patient becoming accustomed to the use of a weak preparation and suddenly securing one of official strength is so evident that no further comment is necessary.

Much the same line of argument applies to all of the products enumerated in the table. Any medicinal preparation that is at all active has possibilities for harm, and these possibilities are greatly increased by any variation in the strength of the preparation which will serve to lend an additional element of uncertainty to the reaction that may be expected from a certain dose.

The possibilities for harm that are involved by the variation in purity and strength of the several preparations included in the above table are altogether too numerous to be reviewed, even briefly, in a communication of this type, but a few of the more objectionable possibilities may be mentioned. The occasional substitution of methyl alcohol as a solvent has already been referred to, as has the use of commercial alcohol containing actively toxic aldehydes and higher alcohols. The very great variation in the per cent content of active constituents is an additional source of danger that is particularly evident in connection with preparations of opium, camphor, iodine, and nitrous ether.

According to the report of the Missouri food and drug commissioner, samples of "Sweet spirits of niter" were found to contain from 0.34 to 4.36 per cent of ethyl nitrite. The sudden substitution of the stronger for the weaker preparation in this series might readily produce results, from an overdose of the nitrite, that would be startling at best.

Tincture of ginger is a preparation that has long been abused in a variety of ways. In prohibition territory it is frequently used as a beverage, and this use of necessity complicates the effects that may be produced by any variation in either the nature or the amount of the extract present or in the nature and amount of the contained alcohol.

Even the less active and alcohol-free preparations in the above list are potent for harm in a variety of ways. Lime water is frequently found to be deficient in strength and may vary from the equivalent of tap water to a preparation corresponding to pharmacopœial requirements. This preparation is widely used as an antacid and corrective in the feeding of infants and invalids, and the unrecognized absence of the alkali would, no doubt, prove to be a disturbing factor of considerable importance.

Solution of hydrogen peroxide is an unusually popular household remedy. It is frequently used as a gargle, a mouth wash, and a local application in cuts, burns, and other wounds. The commercial product may be preserved with acetanilide, may contain an excess of acid, or be altogether devoid of free oxygen. The presence of acetanilide, while perhaps not objectionable as such, entails heterogeneous decomposition products that are nauseating if not otherwise harmful. A preparation containing an excess of free acid might do considerable harm when used as a tooth wash, and a preparation that is devoid of free oxygen may be otherwise contaminated and when used on a wound might prove to be a source of infection rather than a preventive.

While, as suggested above, the household remedies sold by itinerant vendors and in general stores are frequently of inferior quality, much the same is unfortunately true of the preparations sold by licensed pharmacists, who, because of the present-day nature of their business, find it inexpedient to exercise the supervision and control of their drug stock that are expected of them by law or required by the Pharmacopœia of the United States, which is generally accepted as the official standard for drugs and preparations.

In commenting on present-day conditions in the drug business, T. J. Bradley, the dean of the Massachusetts College of Pharmacy, said:

> It is very generally conceded that a very large proportion of technical adulteration is due to carelessness or ignorance on the part of retail pharmacists and only a small proportion to deliberate intent to defraud.

The nature of this carelessness or ignorance is suggested by the food and drug commissioner for South Dakota, who reports that:

> Many of the variations of preparations from the official standards are due to the fact that pharmacists make errors in transposing from the metric system to apothecaries' and avoirdupois weights and measures and the use of incorrect weights and measures or using volume and weight indiscriminately.

Some of the variation in the strength of official and other preparations is no doubt due to deterioration. This question was actively discussed during 1913, and many of the observations and suggestions made in the literature for that year are reflected in Hygienic Laboratory Bulletin No. 98. The fact, however, that deterioration does occur and that it frequently is not recognized by the pharmacist who sells the preparation, is but an additional reason for the enforcement of existing laws and a justification of the resolution adopted by the American Medical Association (J. Am. M. Assoc., 1913, v. 60, p. 2086), which reads as follows:

> Whereas it has been repeatedly shown by the council on pharmacy and chemistry and by the chemical laboratory of the A. M. A., as well as by other investigators, that many drugs and preparations used in the treatment of disease are of unreliable composition, through carelessness, negligence, ignorance, and other reasons; and
>
> Whereas this condition of affairs is against the interest of public health and the progress of the science of medicine; therefore it is evident that greater activity is needed in the enforcement of existing laws relating to drugs and medicines; therefore be it
>
> *Resolved*, That the section on pharmacology and therapeutics requests the house of delegates of the A. M. A. to bring this matter to the attention of the proper Federal and State authorities and urge on them the need for more energetic and effective action in this direction.

From what has been said it would appear that a more energetic and effective control of all drugs and preparations is needed. The desirable and only really efficient method of control involves honesty, knowledge, vigilance, and care on the part of the person selling the product.

Members of boards of health and other State and Federal officials entrusted with the enforcement of laws designed to control the purity and strength of medicinal products should call attention to the desirability of having these laws enforced in a way to secure for the purchaser drugs of uniform strength and purity, with a view of minimizing as much as possible the untoward or secondary effects of potent medicines, irrespective of whether they are used as household remedies or under the direct supervision of a competent physician.

PLAGUE-ERADICATIVE WORK.

CALIFORNIA.

The following report of plague-eradicative work in California for the week ended January 9, 1915, has been received from Passed Asst. Surg. Hurley, of the United States Public Health Service, in temporary charge of the work:

San Francisco, Cal.

RAT PROOFING.

New buildings:	
Inspections of work under construction.	214
Basements concreted (sq. ft., 41.688)	62
Floors concreted (sq. ft., 30,701)	35
Yards, passageways, etc. (sq. ft., 20,055).	101
Total area of concrete laid (sq. ft., 92,444).	
Class A, B, and C (fireproof) buildings:	
Inspections made	253
Roof and basement ventilators, etc., screened	1,316